Rocky Mountain Geographic Science Center
Land Remote Sensing Program - Unmanned Aircraft Systems Project Office

Small Unmanned Aircraft System – Raven (A)

The Raven small unmanned aerial vehicle (SUAV) is a hand-launched reconnaissance and surveillance tool. The system transmits live airborne video images, compass headings and location information to a ground control unit (GCU) and remote video terminal (RVT). The Raven aircraft is hand launched without the need of special equipment or landing area required. The system employs a self-stabilizing aircraft configuration with stability augmentation avionics and provides ease of control and steady video imagery. The optics package includes an electro-optical (EO) color camera nose payload (side and forward look on the same payload) and two infrared (IR) thermal nose payloads (a side look payload or a forward look payload). The Raven system is typically operated by a two person team consisting of a Pilot and Mission Controller.

Raven SUAS Hand Launch

In October of 2009, the U.S. Army provided five SUAS Raven (A) systems to the USGS project office in support of data collection activities within the Department of the Interior (DOI). With cooperation from the U.S. Army, a training program at Dugway Proving Grounds, UT was led promoting SUAS technology for civil and domestic applications. The two week course was attended by 14 students representing USGS, NPS, BLM, AMD, and USFS. The USGS UAS project office, plans to utilize this technology to support various scientific studies which include; analysis of wildfire and environmental impacts; monitoring land change; examining the affects of the mountain pine park beetle of the western states; tracking wildlife; completing ecosystem surveys; improving natural hazard forecasting and mitigation; and to aid and assist in GIS mapping & remote sensing projects within the department.

EO color images collected from the Raven approximately 300 ft above ground level.

USGS science for a changing world

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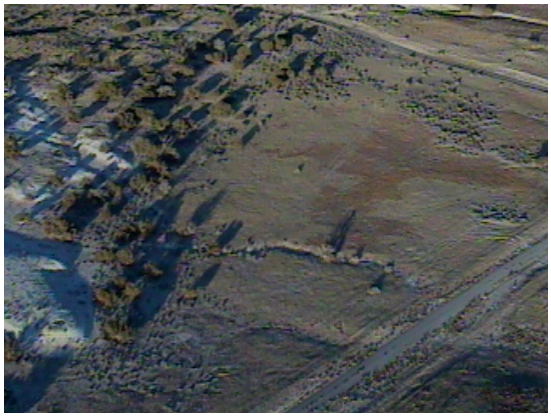
Raven Characteristics

Wingspan	55in.
Length	36in.
Structure	Modular, Kevlar composite
Weight	4.2 lb
Payload Nose Weight	6.5 oz
Operating Altitude	150 to 1,000 ft. AGL
Nominal Low Altitude	100 ft
Cruise Speed	30 mph (13.5 m/s)
Range	10 km (LOS)
Climb Rate	800 ft/min at 2,000 ft AGL
Turn Rate	360 in 24 seconds
Motor	Direct drive electric
Aircraft Batteries	LiSO2 (single-use) Li-Ion (rechargeable)
Flight Duration	60-90 min rechargeable
Launch	Hand Launch
Landing	Commanded auto land deep stall
Navigation	P(y)-code GPS (WGS84) and electronic compass
Flight Control	Manual or autonomous

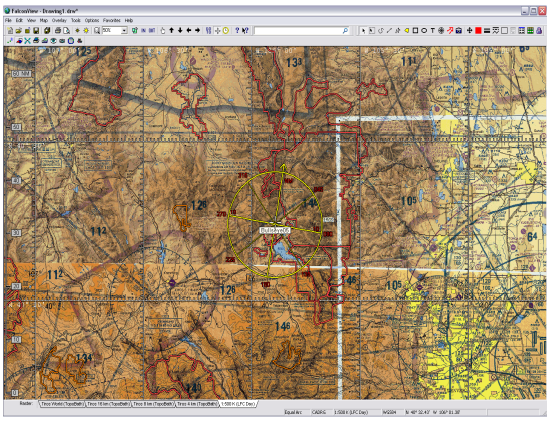
Raven IR (black is hot) imagery taken approximately 250 ft above ground level.



Raven EO visible color imagery taken approximately 350 ft above ground level.

The advantage of SUAS is their portability. The Raven SUAV has 8 parts and can be built onsite.

The system can be connected to a Panasonic CF-18 Toughbook for mission planning, navigation, and flight operations.



The system is flown using FalconView ™ software using an SUAV add-on for flight operations. The software has the ability to read GIS formatted data for seamless preflight planning with your projects.

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NCAP National Civil Applications Program